JPRS 77832

15 April 1981

Worldwide Report

ENVIRONMENTAL QUALITY

No. 301

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available from Bell & Howell, Old Mansfield Road, Wooster, Ohio 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS 77832

15 April 1981

WORLDWIDE REPORT

ENVIRONMENTAL QUALITY

No. 301

CONTENTS

ASIA

PEOPLE'S REPUBLIC OF CHINA

Links Between the Four Modernizations, Environmental Protection Analyzed
(Ma Shijun, et al.; GUANGMING RIBAO, 20 Feb 81)................. 1

Study Shows Relationship of Cancer to Environment
(Fang Rukang; ZIRAN ZAZHI, Feb 80)............................. 14

Beijing Effort To Control Air, Water Pollution
(XINHUA, 27 Mar 81).. 24

Pollution Control Plan for Kunming Municipality Outlined
(YUNNAN RIBAO, 4 Feb 81)....................................... 26

Pollution in Zhoushan Fishing Grounds Discussed
(WEN HUI BAO, 28 Jan 81)....................................... 28

Drought, Flooding Increasing in Yunnan
(Wang Huanxiao, Zhou Hong; HUANJING, No 1, 1981)............... 30

TAIWAN

Government Drafts Law on Noise Pollution
(CHINA POST, 23 Mar 81).. 33

LATIN AMERICA

BARBADOS

Briefs

New Environmental Body 34

BERMUDA

Briefs

Power Company Pollution 35

JAMAICA

Briefs

Oil Cleanup Criticism 36

SUB-SAHARAN AFRICA

ZIMBABWE

Briefs

Cloud Seeding Ends 37

LINKS BETWEEN THE FOUR MODERNIZATIONS, ENVIRONMENTAL PROTECTION ANALYZED

Beijing GUANGMING RIBAO in Chinese 20 Feb 81 pp 3-4

[Article by Ma Shijun [7456 0013 7486], Liu Jingyi [0491 7234 1355], Tang Hongxiao [3282 7703 7197], and Wang Deming [3769 1795 6900]: "Modernization and Environmental Protection"]

[Text] Environmental problems for the most part, are caused by human life and by the rapid development of production activities, and they produce a great effect, in turn, on human life and the development of production. Being the inevitable outgrowth of the process of modernizing human society, they are problems requiring appropriate solutions.

1. Relationship Between the Production Activities of Modern Human Society and the Natural Environment

(1) The Natural Ecological Balance and the Human Living Environment

The Structure and Function of the Natural Environment. The so-called envornment means the space in which mankind and other living beings exist. This space is filled with numerous kinds of things of different properties, structure, and motion states. The number of these environmental components and the role they perform vis-a-vis man may be greatly different depending on the place, the time, and the extent of impact of man's activities.

The earth's surface is composed of the atmosphere, the hydrosphere, and the lithosphere (including the soil), and the area suited to the survival of living organisms is called the biosphere. The majority of organisms are concentrated in regions close to the atmosphere, bodies of water, or the land.

From the surface of the earth upward for several score kilometers, and on up to nearly 1,000 kilometers in the high altitudes, is the atmospheric covering composed of many different gases, which not only provides all living things with the carbon, hydrogen, oxygen, and nitrogen elements that they need, but also protects organisms on the surface of the earth from the danger of all sorts of cosmic rays from outer space, and prevents violent changes in the temperature of the earth's surface and the loss if its moisture. The hydrosphere includes the oceans, rivers, lakes and ponds, and underground water. The oceans account for 97 percent of the total quantity of water on earth, and cover more than 70 percent of the earth's surface. They are the place where life originated, and they are also a storehouse of many materials. As a result of long years of weathering and erosion and the action of organisms, the surface lithosphere has gradually been turned into different kinds of soils.

Soils form the foundation for plant growth, providing plants with minerals, organic fertilizer and moisture. Under the illumination of sunlight, as a result of photosynthesis, all sorts of plants thrive and grow to produce forests, meadowlands, and farmlands that provide for man and other creatures foodstuffs and needed ecological conditions. As a result of airflow, evaporation, and precipitation among the three spheres, an energy exchange and material cycle takes place, which imposes a definite degree of balance and regulatory function on the biosphere.

The cycling of matter and the flow of energy are major functions of the natural world. In addition to their role in inanimate processes, they frequently take in, play an intermediary role in, and are completed in various biological groups including plants, animals, and micro-organisms. The interplay between man or a biocenosis and the surrounding environment, which through a common flow of material and a flow of energy builds an organism-environment complex, is an ecological system. Forests, rivers, farmlands, and cities are all ecological systems of a different character. Every ecological system has its own localized and specialized structure, as well as its laws governing the cycling of material and the transformation of energy, whereby the mutual interactions and cause and effect relationships between that system and the environment are formed.

The biocenoses in the ecological system are shaped largely by the nature of the food chain. Numerous food chains interconnect to form ever more complex food networks. Not only are there changes in the types of the organic components that make up the food chain (or network), but increases and decreases take place in their numbers as well. In an association of specific quantities and types, the formation of relationships of interdependence and interaction makes the growth of the entire system develop in the direction of attaining optimum stability for the entire structure, which is attained through a balance between what is received and what is expended.

One striking property of the flow of materials through the food chain is the function of organisms in concentrating materials. Certain heavy metal elements or other toxic substances that the natural world is unable to decompose do not occur in high initial concentrations in the environment, but these are gradually enriched as they move through the food chain, and after entering the human body, they may be increased several hundred times or several million times, and become toxic to the organism.

In the course of their long period of evolution, the biosphere and the natural ecological system have established a relationship of intercoordination and compensation as well as a dynamic equilibrium of the natural world. Man is also a part of and has adapted to this balance. If any link changes within certain limits, the entire system undergoes appropriate adjustment to maintain the original dynamic equilibrium without impairment.

Modern Man's Living Environment. Man's activities constantly affect and change the natural environment. As society becomes more modern, the gap between its environment and the natural environment becomes greater. In densely crowded cities and industrial regions, in particular, the make-up and laws governing change of the environment are far removed from that of the natural environment. But in view of the needs of human life and of survival, as well as the extent to which physiological functions are capable of adapting to environmental changes, there are definite criteria and limits to change. The materials and the quantity of materials that the natural system is able to decompose is also limited. If the activities of modern man cause violent changes in the environment, or if the quantity of harmful substances dumped into the natural ecological system is excessive, exceeding the regulating capacity of the natural system, or exceeding the degree to which organisms or mankind can tolerate them, the ecological balance will be destroyed, and both man and other organisms will suffer injury.

Because the flow of energy and the flow of matter in the biosphere follows definite lines and patterns, and since all chemical elements combine, decompose, are reused, and go on in an endless cycle according to definite laws, looked at in terms of the regulatory function of the entire biosphere, the natural environment and the human living environment are an inseparable totality. Anything that destroys the natural equilibrium or disturbs the normal functioning of the ecological system over a wide area must inevitably either directly or indirectly affect the human living environment.

Obviously, without the earth's natural environment, man could not survive. However, man is now disturbing and destroying this normal cyclical functioning as well as the natural ecological balance founded on it.

(2) Utilization of Natural Resources and Environmental Protection

The natural environment is not only the place from which man draws the basic substances of life, it also provides man the foundation for raw materials for production. People have gradually come to recognize that the environment is a resource. On the basis of their properties, natural resources may be roughly divided into three kinds.

(1) Ecological resources (also termed fixed resources) such as the sun's radiation, atmospheric temperatures, and moisture. These are not subject to change by the will of man. These resources have an evident regionality, which if fully used, adapted to local conditions, and taken advantage of, may be used forever.

(2) Biological resources such as forests, grasslands, birds, animals, fishes, insects, and bacteria, as well as the soil. These resources are characterized by their renewability. If sensibly used, scientifically tended and nurtured, they will not only go on living endlessly, but they can also be bent to the will of man in planned enlargement of their propagation.

(3) Mineral resources including coal, petroleum, and ores. There is a limit to the reserves of this category of resources, which are substantially non-renewable. How to adopt comprehensive measures to derive fullest advantage from the potential

of all these materials is the key to rational utilization of this category of resources, and it is also a preventive measure in reducing industrial pollution by the "three wastes." [waste gas, waste water, and industrial residue]

The goals of environmental protection are, first, maintenance of a fine living environment for mankind, and second, preservation of the resources that man needs. These two objectives have to be carried out in coordination, complementing each other. Only if good care is taken of the forests, the grasslands and bodies of water can the biological resources continue to exist and use be made of their self-purifying role in regulating the environment. Because numerous countries misuse natural resources and recklessly discharge the "three wastes," they intensify the pollution and destruction of the environment. The fundamental reason is that people counterpose the use of natural resources and environmental protection. They are concerned solely with large-scale consumption of resources to satisfy current production quotas without regard for effects on the environment, ignoring the integral relationship of natural resources and environment. Even less are they concerned with the true benefits for society of such production methods and the bad consequences they may create. In other words, they lack an integrated conception of national economic development.

(3) Ecological Laws and Economic Laws of Environmental Protection

As said in the foregoing, the natural ecological system is a self-sufficient functioning unit. Plants synthesize inorganic matter into organic matter to provide animals food to eat. The excreta and remains of animal and plant organisms are decomposed by micro-organisms for reabsorption by plants. This process is known as the metabolism of the ecological system. This metabolic process entails various fundamental ecological laws. These laws constantly harmonize the structure and function of the ecological system. The harmony of structure and function are prerequisites for the attainment of dynamic equilibrium. Equilibrium between input and output of matter and equilibrium in the exchange of gases provide the material foundation for the realization of dynamic equilibrium; thus the natural ecological system contains many parallels to socio-economic laws.

The equilibrium between investment and benefits, and net profit are basic principles of economics that must be taken into consideration. Economic principles contain two implications for environmental protection. One is the benefit versus the investment required to recover any given pollutant. Consideration of whether any given objective pays may be termed a general economic principle. A second is overall consideration of gains and losses in the case of a region or an entire integrated complex, using a multiplicity of actions to get the maximum effect from the intercorrelation of multiple actions. This may be termed a principle of macro-economics, and it is also a principle of ecological economics.

The solution of environmental protection problems on the basis of the principles of ecological economics requires not only control of individual matters, but also attention to comprehensive control and what overall gains and losses will be, overall consideration of foodstuffs, energy resources, population resources, population, and such major social problems of modern man. Their mutual dependence and mutual transformation must be explored in a search over a broad area for the means of common solution. These are fundamental problems requiring joint study and solution by natural scientists and social scientists working together.

Interim Summary

The natural environment is the space on which modern man depends for his existence. Cosmic space is infinite, but the space suitable for the survival of man and other creatures is finite, and determined primarily by the physiological adaptability of man and other creatures. The relationship of dependence between man and his natural environment as well as the ecological balance of the natural world (specifically the biosphere) was formed millions of years ago. Underpining this balance is a cycling of matter and an exchange of energy that operates according to laws. This movement of matter and energy is completed through colonies of organisms, including man. Interaction among organisms and the potential that is stored in the inorganic environment causes a certain degree of mutually reinforcing regulatory functions among each of the components of the natural ecological system, but this is limited and fragile. If mankind destroys these normal functions, he must inevitably transform the balanced relationship between mankind and the natural world, i.e., the structure of the space on which man relies for existence, thereby threatening the survival of man himself.

The environment is a resource on which man relies for survival. In terms of man's material life and the economic construction done, man-resources-environment are a totality. Natural resources are an integral part of the environment, and they play an important regulatory role on the environment. Destruction of resources means destruction of man's living environment. Natural resources, particularly biological resources, are inseparable from ecological resources and the local natural environment (including both what has existed in the past and the present). Man can apply and should apply modern scientific and technological achievements as well as his knowledge of natural laws to change the natural environment, but he must treat natural resources and environment as a totality. Only in this way can he both develop resources and protect the environment.

Environmental problems are at once an ecological problem and a socio-economic problems requiring combined application of both ecological laws and economic laws in order to achieve suitable balance in the development of the socio-economic and the ecological environment. In fact, there are numerous parallels in theory between economics and ecology. This combination points the way for the future modernized building of society, coordinating high speed economic development with environmental protection.

2. Development of Environmental Work Abroad

(1) Several Stages in the Development of Environmental Pollution Worldwide

The problem of worldwide environmental pollution began with the industrial revolution in capitalist countries, and gradually grew during the early part of the 20th century. At that time some environmental problems appeared, as for example, in Great Britain where there was continuous smog, which aroused the concern of society.

During the 1950's, petroleum was added to coal as an energy source. The rapid development of organic chemical industries and automobile industries following two world wars made environmental problems take on a further widespread social character.

Since the 1950's, rapid industrial development has taken place in capitalist countries, and problems in environmental pollution have also grown to their highest point. Pollution of water, the atmosphere, and the soil has intensified; the effects of urban noise have become pronounced; and the ecology has been severely damaged. Not only the land, but the oceans and the upper altitudes have also been polluted.

By the 1960's the social effects of environmental pollution had become a worldwide problem, and people's concern about a future environmental crisis deepened daily.

(3) New Trends in Environmental Protection Abroad

Following more than 10 years of vigorous efforts at control on the part of western capitalist countries, remarkable improvement in the environment occurred during the late 1970's, but environmental quality has yet to be fully restored. As economies continue to develop, new environmental problems continue to appear.

(1) Sytems polluted by toxic substances in the environment that are difficult to degrade cannot be revived. Substances accumulated at the bottom of lakes, streams, river mouths, and bays become new secondary sources of pollution, which once accumulated in large amounts are difficult to reverse. Polluted soil and underground water may not be able to be restored for several decades or even in a hundred years or more.

(2) New pollutants constantly appear, and are strikingly revealed in chemical carcinogenic substances. New man-made synthetic chemicals appear yearly by the thousands making evaluation and control difficult. New varieties of agricultural pesticides constantly appear, and determination of their environmental degradability and their toxicity in intermediate products is difficult to figure out.

(3) Change of energy sources has led to new environmental problems. The petroleum crisis led to the revival of coal as an energy source, thereby causing new pollution, particularly problems with pollution of the atmosphere.

(4) The problem of nutrients in water. Even after large treatment plants are used to treat waste water, the water contains large quantities of nutrient nitrate and phosphate compounds. When the large amounts of washing compounds used in urban areas that are discharged into water are added to this, the enriched nutrient problem becomes pronounced.

(5) Future trends in the human environment are receiving more and more attention. The manifold increase in pollutants used in the natural environment may finally destroy the ecological balance of the biosphere for all of mankind, producing irreversible consequences. A matter much discussed abroad is the possibility that atmospheric pollution may bring on a change in the climate of the entire globe. Some people predict that by the year 2000 a crisis will occur in the world's environment.

Foreign countries are now in process of studying the interdependence and interaction of environment, resources, population, and development. The rapid growth of populations and economies has intensified the consumption and depletion of resources, and has led to the pollution and destruction of the environment, further reducing the utilization rate of resources.

Destruction of the natural ecological balance along with population pressure has also created degeneration of the agricultural environment. Improper industrial development, waste of resources, and pollution of the environment have impelled populations to flood into cities, creating further deterioration of modern cities. From this may be seen that continued economic growth requires interaction between the environment and development, and this needs to guide the formulation of development plans in all countries.

3. Various Problems in China's Environment

Pollution and damage to China's environment has already reached a fairly serious state, manifested particularly in the deterioration of urban environments, the pollution of rivers and lakes, and damage to the natural ecology. Prior to Liberation the layout of China's cities was irrational, and since Liberation cities have grown rapidly (43 cities with populations of more than 500,000, of which 15 have populations of more than 1 million). Because of population density, the irrational distribution of industries, and poor management, pollution of the air and the water of urban areas, as well as noise pollution of the environment have become worse. Looked at in terms of the process of growth of environmental pollution in industrially advanced countries, if we now lack full foresight and take no action, once environmental pollution reaches its high point, an environmental crisis will become unavoidable. History will pass sentence and we will pay a very high price indeed.

(1) Atmospheric pollution

Atmospheric pollution derives principally from the burning of combustible minerals such as coal, petroleum, and natural gas. The atmosphere contains numerous kinds of pollutants, principal of which are dust, sulfide compounds, nitrides, carbon monoxide, ozone, and hydrocarbons.

In terms of its source, atmospheric pollution is principally of the coal type or petroleum type, or a mixture of the two.

Coal type pollution. The sulfur dioxide that is a waste product from the burning of coal is oxidized in the atmosphere and combines with water vapor to form a sulfuric acid mist, which is highly irritating to the respiratory tract, and has a great effect on the health of the human body.

More than 70 percent of China's energy today derives from coal, and petroleum and natural gas account for 25 percent. The energy utilization rate is less than 30 percent. The pollution problem is compounded by the use in China's cities of stoves with short chimneys with an effective combustion rate of only somewhat more than 10 percent, the use of heaters of small tonnage and low efficiency for which the kindling points are seriously diffuse.

Meriting discussion is the problem of urban lung cancer. Of all occupational tumors, lung cancers are most numerous. It is believed that the 3,4-benzopyrene polycyclic aromatic hydrocarbons, which are discharged in the burning of coal or cooking of coal processes are carcinogenic. The presence of sulfur dioxide also has a role in promoting cancer. In the cities of Beijing and Shanghai, the incidence of lung cancer is close to that of large cities in foreign countries (20-odd cases per 100,000).

Petroleum type pollution. Under powerful ultra-violet radiation in the atmosphere, nitrogen dioxide can have a series of photochemical reactions with petroleum hydrocarbons and oxygen to produce powerful oxidizing agents such as ozone and peroxo-acetyl ethyl nitrite (abbreviated as PAN). Under certain climatic and geographic conditions, the photochemical smog produced by powerful oxidants can irritate the eyes and throat, corrode materials, damage crops, and reduce visibility.

Automobiles are not numerous in China at the present time; nevertheless, the production of photochemical smog is not to be taken lightly. As China's petrochemical industry develops, petrochemical smog can also develop in China.

Atmospheric pollution is general and serious throughout China, and national emphasis should be placed both on its prevention and control and on related research.

(2) Water pollution

Water is a precious natural resource. The earth's fresh water amounts to less than 2.7 percent of the total supply of water, and the useable amount is less than 1 percent of the surface water found in streams and lakes, plus some of the underground water. Though China has abundant fresh water resources, the distribution of its water is uneven, and numerous places are lacking in water. Particularly serious is the discharge into the water supply without treatment of urban waste water and industrial waste water (in 1979, 78.8 million tons of waste water was discharged daily throughout the country), and an appreciable amount of pollution from the atmosphere and the soil finds its way into the water supply as well, vastly exceeding the self-purification capabilities of the water supply. Water quality has declined everywhere, especially the quality of water in urban areas.

The water environment and water pollution. The water environmental system includes the water supply stored in rivers and lakes, and underground; it also includes substances suspended in the water, bottom mud, and aquatic life. By water pollution we mean the discharge of pollutants into the water supply in excess of the water's natural purification abilities, causing a deterioration of water quality.

In China, pollution of the water supply is fairly universal. In a preliminary evaluation of 30 major streams and lakes using some major pollutants as pollution parameters, from the second Sungari River and the Liao He in the Northeast, to the Grand Canal and the Huangpu Jiang in southern Jiangsu, to the Pearl River in South China, all were polluted. Though the Yangtze River has strong powers of dilution, the surface of the river was polluted in scores of places, and its tributary, the Xiang Jiang is seriously polluted. Nor has Dianchi, a lake in Yunnan, escaped.

China's water supply has been polluted by heavy metals, most notably mercury.

Heavy Metal Pollution. By heavy metal pollution we usually mean mercury, cadmium, lead, chromium, and arsenic, all of which are toxic elements. They are widely distributed throughout the natural world, and mining and smelting are the main sources for release into the environment of heavy metals. They cannot be degraded by microorganisms in the water supply, but may give rise to processes of mutual transformation, dispersal, and concentration in various states, which is collectively known as the migration and transformation of metals.

Looked at in terms of toxicity and their danger to organisms and to man, small concentrations of heavy metals in water can produce toxic effects.

China mines and uses a fair amount of mercury and other heavy metals, which have seriously polluted some streams. Though pollution control in some plants has been initially effective, the migration, transformation, and effects of bottom mud containing mercury as well as problems of treating it is a problem still urgently awaiting study.

Nutrient enrichment of water. Plant nutrients such as nitrogen and phosphate are precious materials for the growth of agricultural crops, but an excess of nutrients enters the natural water supply to cause deterioration of its quality, impairment of development of the fishing industry, and damage to human health. Accompanying modern industrial and agricultural production, particularly development of the chemical fertilizer industry, has been a constant increase in nutrients, which get into the cycle of surface material. Only part of the chemical fertilizer spread on fields is absorbed by the crops. Under ordinary circumstances, only somewhat more than half the nitrogenous fertilizer is used by plants. Most of the nitrogenous materials are carried away into the underground water or the surface water by runoff. If proper use is not made of agricultural wastes such as the stalks and stems of plants and livestock manure, they too can become a source of nitrates in the water. Surveys done during the past several years show that a large quantity of the underground "fertile water" containing nitrogen in a nitric acid state in China derives largely from agricultural wastes and waste water. Large-scale use of washing compounds containing phosphates, have increased the phosphate content of waste water.

"Nutrient enrichment" of bodies of water is a phenomenon of old age denoting an increase in plant nutrients in the water leading to great proliferation of aquatic organisms such as algae, which consume the dissolved oxygen in water, with the result that fish are unable to survive in it. When nutrient enrichment occurs in ocean water, it is termed "red tide." Since more than 90 percent of urban waste water in China receives no treatment after being flushed away, water quality is seriously affected.

Ocean pollution. Guarding against ocean pollution is a major aspect of world environmental protection. The discharge of large quantities of pollutants from the land by rivers, and their accumulation in river mouths, bays, and harbors, and the pumping of petroleum and transportation of petroleum in the seas makes for easy pollution of the oceans. China has a long seacoast and abundant ocean resources. Varying degrees of pollution by petroleum and heavy metals has occurred at river mouths in Dalian Bay and in the Yellow Sea and Bohai, where the red tide has also taken place to the definite impairment of aquatic products and the ecology and environment. Along with the continuous growth of coastal industry, transportation, and international trade, as well as extraction of petroleum from the ocean, guarding China's oceans against pollution must be given serious attention.

(3) Soil pollution

Soil resources constitute the major material foundation for agricultural production, and are also the material foundation on which mankind's survival depends. They are extremely valuable natural resources. The utilization of soil resources involves numerous environmental problems, such as increase in population and expansion of the cultivated area, destruction of ground cover and erosion, deterioration of grasslands and desertification of the soil, alkalinization, and soil pollution.

Soils are a complex system in the natural environment, which interact with the atmosphere, the hydrosphere, and the biosphere. In the course of getting resources and energy from the natural world for production activities, mankind either directly or indirectly through the atmosphere, the water, or organisms, discharges into the soil system the "three wastes" that result from mining, processing, distribution, or consumption. When the "three wastes" destroy the original equilibrium of the soil system, soil pollution results.

Accompanying the use of fertilizers, pesticides and irrigation in agricultural production is a build-up of pollutants in the soil, and this is a major way in which the soil is polluted. Second, the soil has always been a dumping ground for waste, garbage, and waste water. Furthermore, pollution of the soil by the migration or transformation of pollutants in the air or water is not new, as for example when the sulfur dioxide or nitrogen dioxide "dry rain" enters the soil making the soil acidic. Irrigation with polluted water can also pollute the soil.

Many of the pollutants in the soil are the same ones found in the air and water. Those found in large quantities over wide areas are organic synthetic pesticides and herbicides. Soils differ from place to place, and their pollutant load bearing capacity also differs. Thus research must be conducted by adapting general methods to local situations depending on circumstances.

In the processing of modernizing Chinese agriculture, the large-scale use of pesticides and chemical fertilizers, the consumption of energy in the mechanization of agriculture, the blossoming of medium and small-scale industry everywhere, the construction of medium and small-scale water conservancy projects, and the building of large chicken and pig farms will present a series of problems for protection of the agricultural environment.

(4) Noise pollution

Urban noise is yet another major modern environmental pollution. Study shows that 45 decibel noise can affect sleep; 65 decibel noise can affect work and study; and serious noise can produce a series of physiological and psychological reactions, causing numerous illnesses. Noise at the 175 decibel level can cause death. Abroad, noise is regarded as one of the three great environmental pollutants and is strictly controlled. In letters received from the large cities of Beijing and Shanghai on the subject of environmental pollution, noise occupies first place, appearing in more than half the letters. Monitoring has shown noise to be above 80 decibels in the cities and suburbs of Beijing, Shanghai, Tianjin, Nanjing, and Hangzhou. In some streets and areas, nighttime noise levels are at the 70 decibel level. This problem has yet to be solved.

The main source of urban noise is traffic noise, namely driving, scraping, shaking, and horn sounds. Urban traffic noise in China is universally higher than in foreign countries. Beijing with only 100 and some thousand vehicles has higher traffic noise than Tokyo with more than 2 million vehicles. It has become a notoriously noisy city in the world. In China, solution to the traffic noise and industrial noise problems are urgent matters.

4. Exploration of the Way To Deal With Environmental Protection in China

No complete scientific survey and analysis of overall environmental pollution in China has been done as yet, but on the basis of existing partial data and some prominent cases, China's environmental pollution and destruction of its ecological balance is presently quite serious. Disturbing is that this trend toward deterioration is still under way. Unless there is pompt coordination of the environment with development, further deterioration of the environment will become a stumbling block for realization of the four modernizations!

We believe the following work should be given attention in this regard:

(1) Correct handling of the relationship between environment and development, with environmental work being made a part of the national economic plan.

Environmental problems are intimately related to a nation's energy structure, its use of resources, the growth of its population, the pattern of its industry and agriculture, and its building of its cities and countryside. National economic planning begins with doing a good job in overall balance, doing this in accordance with ecological laws and economic laws. Rapid development of the economy is positively not to be obtained at the cost of waste of resources and sacrifice of the environment.

The tragic road foreign countries have trod in "pollute first and clean up later," has provided us with a painful lesson. The state and all departments and regions should make a certain investment in environmental protection and environmental protection research. At the very outset of the four modernizations, we should give attention to no further pollution or the least possible amount of new pollution. In the placement of major projects, the pattern of industrial and agricultural production, and newly built enterprises, pollution control projects should be given comprehensive consideration and rational arrangements made to the greatest possible extent.

(2) Through a combination of numerous methods and numerous techniques, active control of pollution from existing enterprises.

China has several hundred thousand industries, with circumstances differing from one to another. In the majority of enterprises in which economic benefits can be obtained simultaneous with the elimination of pollution, we should give priority consideration to investment to effect control. In some in which a small investment can bring control, control should be effected without fail as well. We should assign an order of precedence to the others, distinguishing the order of importance and urgency, and giving emphasis on the basis of the seriousness of pollution damage to the sequential solution of problems over a period of time. In deciding projects for control, to the maximum extent possible economically effective new modern scientific and technical accompolishments should be used in combination with diversified methods for comprehensive efforts to turn the harmful into the useful and the useless into the valuable, making the waste products of this plant the raw materials of that plant. Simultaneously, full use should be made of the self-purifying role of the environment to eliminate pollution, as for example, the use of trees to purify the atmosphere and to lower noise, the construction of purification ponds and oxygenization ponds for waste water, the growing of aquatic vegetation to purify polluted water, and using waste materials to produce methane gas, all of which are methods requiring little investment for great benefits. Additionally, use should also be made of new theories such as systems theory, control theory, and ecological economics in combination with new techniques for enterprise management, technical innovation, technological improvements, project administration, multiple uses, and environmental self-purification, linking together the prevention of pollution and the rational development and use of energy and resources, and linking together control of urban pollution and urban planning and reform so that our scant available funds will be used where they are needed most in order to gradually improve the quality of China's environment.

(3) Vigorous development of scientific research with constant increase in the scientific standards for protecting the environment.

The human environment is distinctly regional and socialized in character, and environmental protection problems in individual countries have their own individual characteristics. How to combine a study of foreign experiences with the situation as it exists in China to draw up a technical program of environmental protection for China urgently requires vigorous scientific research of a strategic nature in order to provide scientific data for the formulation of policies. Though research into environmental science and technology in China has made a start within the past several years, the work is still rather scattered, and some research work of an overall or basic nature has not been started or is still in its infancy. Examples are policies regarding China's energy system and control of atmospheric pollution; the problem of construction of large-scale treatment facilities for waste water; an overall assessment of the use of industrial waste water in the irrigation of farmland; the basic make-up of China's pesticides and herbicides; an evaluation of the major areas of pollution and the environmental quality of water supplies in them; study of urban ecological systems, and forecasting of the countrys' environmental state, etc. Environmental science is a science that is strongly composite in nature, which has grown out of the struggle between man and his environment. It is now developing in depth, and this tendency must be given serious attention. Its detection of the action and functional mechanics of pollutants both atomically and molecularly, and ability to check levels of pollution has increased from 1 part in 1 million to 1 part in 100 million and even 1 part in 1 trillion, and has also provided data in the form of overall assessments of different environments, forecasts, and scientific management from overall study of the dynamic laws of various environmental systems for communities, entire processes, regions, or the entire world.

Environmental science has also continuously permeated the social sciences. Since pollution and destruction of the environment is a waste of resources, the expenditures needed for prevention and prevention of the economic waste caused by waste of the environment requires diligent economic analysis, both for the present and the long term. Environmental economics and management may be said to be a major aspect of a combination of technical science, natural science, and social science, and a trend as well in the development of environmental science. In order to manage the environment scientifically and conscientiously assure implementation of the "Environmental Law," all sorts of environmental quality standards, and all sorts of standards for discharge of wastes must be formulated. The study of environmental management and economics has a weak foundation in China that is urgently in need of development.

Study of the aforementioned major problems require earliest unified planning, organization for implementation, and major breakthroughs.

Finally, a few suggestions are offered about the system for environmental research.

At the present time, China's environmental research work is done by the Chinese Academy of Sciences, institutions of higher learning, various organizations of the central government, and local environmental protection systems. Nationally, environmental science and technical, and monitoring personnel number 5,000, and the quantity and quality of both manpower and material resources and facilities is far from meeting the needs of the task. Furthermore the work is quite scattered and in urgent need of enhanced leadership and unified planning for a clear definition of the division of labor and coordination of each system, and the fullest use of individual advantages and individual characteristics. We recommend that the national environmental protection system lay particular emphasis on study of environmental legislation, policies, regulations, standards, monitoring, and management. Local environmental research units should emphasize study of local environmental problems; each industrial unit should emphasize study of prevention and control of pollution in its own industry. Institutions of higher learning and the Chinese Academy of Sciences should place special emphasis on basic environmental science, application of new techniques, and the study of major overall questions. Since the country's financial resources, material resources, and key scientific cadres are insufficient, trial use may be made of a contract system in environmental protection research. Planned emphasis should be placed on the selection for support of some basic research units for the early establishment of various specialized environmental research centers, and there is no need to set up research institutes echelon by echelon according to the administrative systen, large areas, or provinces, and municipalities.

9432
CSO: 5000

STUDY SHOWS RELATIONSHIP OF CANCER TO ENVIRONMENT

Shanghai ZIRAN ZAZHI [NATURE JOURNAL] in Chinese Vol 3, No 2, Feb 80 pp 126-129

[Article by Fang Rukang [2455 1172 1660] of the Office of Environmental Geography Research, Shanghai Teachers University]

[Text] Following the conquest over smallpox and tuberculosis, which had been regarded as incurable diseases, since the sixties in the 20th century, malignant tumor--cancer--has become one of the most serious diseases damaging the health of mankind.

In the past decade, men have been continuously searching for the pathogenesis of cancer. Today many researchers believe 80-90 percent of the cancer in mankind is induced by environmental factors. Some even believe that "almost all carcinomas appear to be induced by the environment."[1] While at present there is some tendency to think that the occurrence of cancer is related to industrial pollution, in many regions carcinomas appear to be unrelated to industrial pollution. They seem to be related to the local geographical environment. This fact cannot fail to attract people's attention to the study of the relationship between the geographical environment and cancer.

I. Some Facts Deserving Attention

The most basic characteristics of the geographical environment are its structural uniformity, the zonal property of its spatial distribution, and the periodic property with respect to time. These characteristics affect the lives and livelihood of mankind at all times. The relationship between the geographical environment and people's health was recognized very early, but a relatively profound understanding of the close relationship between some endemic diseases and cancer and the geographical environment is a matter of the past 10 or more years. This understanding is primarily caused by the discovery of the following valuable facts:

1. The contents of chemical elements in man's blood correspond to those in earth's crust.

It has long been known that the human body contains various elements. If all the elements in a person's body are weighed, we discover that the 11 elements oxygen, carbon, hydrogen, nitrogen, calcium, sulfur, phosphorus, sodium, potassium, chlorine, and magnesium amount to more than 99.9 percent of the total weight of the human body. Although the content of other elements is very small, their function is extremely important because these trace elements are often the constituent elements of hormones, enzymes, and vitamins, which have great significance in the biochemical function of the living process of the organic body.

In the seventies a precise and correct determination of the content of chemical elements in the human body was made. The result disclosed for the first time that the average content of many chemical elements in the human body has an obvious uniformity with their average content in the earth's crust.[2] (see Figure 1)

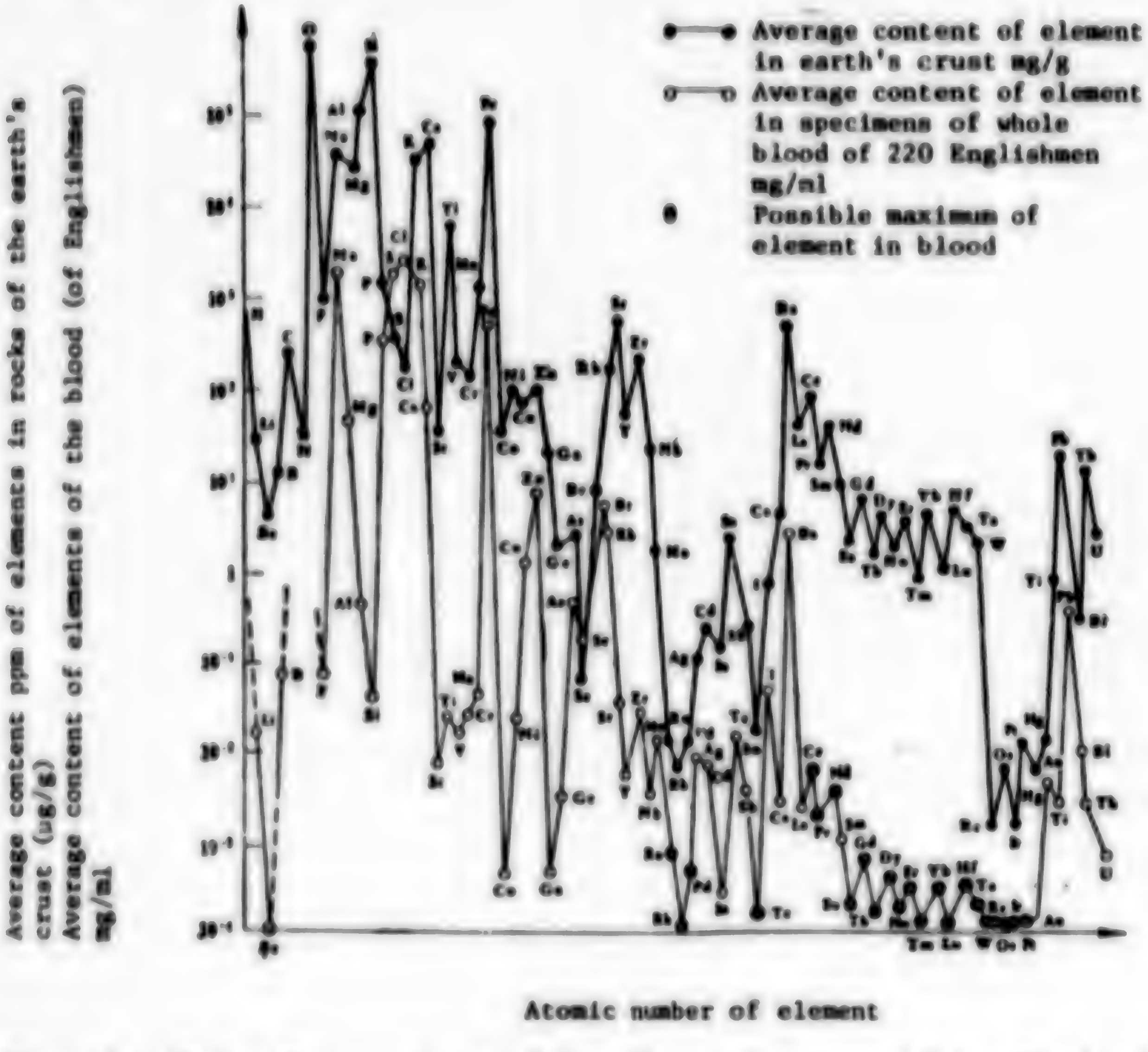

Figure 1. Obvious Correspondence of Rare Element Contents of Human Blood and the Earth's Crust

This fact clearly indicates that life and the geographical environment form an organically linked unity.

2. The distribution of chemical elements in human tissue is obviously selective.

In the human body, the various chemical elements are concentrated in the respective organs and tissues to take up important functional burdens of living. For example, the elements calcium, phosphorus, etc are the major constituents of the skeletal bones; iron, cobalt, etc are the major components of blood; manganese, molybdenum, copper, and zinc are the important components of many types of oxidation enzymes, and so on. The activities of these elements bring men close together with their surrounding environment.

Most recently, another discovery was made. The distribution of chemical elements in the various tissues of the human body is obviously selective. That is to say, some elements are particularly easily absorbed and concentrated in some tissues.

For example: in brain tissue--cadmium, strontium, bromine, aluminum, etc.
in kidney tissue--bismuth, lead, cadmium, selenium, arsenic, silicon etc.
in liver tissue--lead, iodine, samarium, selenium, arsenic, zinc, copper, etc.
in lung tissue--antimony, tin, selenium, chromium, aluminum, etc.
in lymph tissue--uranium, terbium, antimony, manganese, lithium, etc.[3]

These facts not only demonstrate the intimate association between the human body and the environment, but also reveal the possibility that a deficiency or excess of certain elements in the environment surrounding us may induce a disorder in the tissue of a certain organ.

3. The lack of uniformity of distribution of chemical elements in the earth's crust.

The relationship between chemical elements and the human body is as intimate as that, and yet the distribution of the various chemical elements in the earth's crust is not even. It is already understood that the chemical components of water, soil, and even the air are not entirely the same in the mountains and the plains, or inland and on the coast. Furthermore, even in two mountainous areas the content of chemical elements of different parent rocks is not the same. For example, cobalt, nickel, chromium, zinc, boron, etc exist in relatively large quantities in basic igneous rocks; barium, zirconium, lanthanum, etc exist in relatively large quantities in acid igneous rocks; while the distribution of manganese, strontium, etc is relatively even. The content of an individual element in different rocks is also different. To use molybdenum as an example, its content in ultrabasic rocks is 2 ppm; in basic rocks, 14 ppm; in neutral rocks, 9 ppm; in acid rocks, 10 ppm; and in sedimentary rocks as high as 20 ppm. Through water, soil, air, animals, and plants, the effect of this kind of unevenness may possibly create deficiency (insufficient) or excess (toxic) of certain elements needed by the human body in groups of persons of different regions.

4. Regional difference of distribution of some cancerous diseases.

Through surveys and studies of the past 10 or more years, it has been discovered that some cancerous diseases, especially cancers of the digestive system, have obvious regional differences.

In the United States, the high-incidence regions of cancer are distributed mainly in the Northeast, the areas surrounding the five Great Lakes, and the coastal region of the South.[4] In view of current analyses, this type of difference is not only related to the primary environment (such as the high incidence of skin cancer in the southern region of intense light exposure), but also to the secondary environment. The excessive mortality rate of several cancerous diseases (mouth, throat, esophagus, urinary bladder, etc) is concentrated in the Northeast, an area of high industrialization, and is limited to males. This fact indicates a possible relationship to occupation. For example, industrial pollution of the environment has induced obvious geographical groups of male urinary bladder cancer.

For the purpose of looking for the pathogenesis of cancer, researchers of related sciences in China have gone to regions of high incidence of cancer in recent years to carry out on-site observation and study, and they discovered that the occurrence of some cancerous diseases also has a definite regional characteristic. For example, esophageal and penial cancers are more numerous in North China, while the incidence of liver and rhinopharyngeal cancer is higher in East, South (especially Jiangsu, Guangdong, and Guangxi) China, and along the seacoast. In the Northeast, Central, and Northwest, gastric cancer is the first among common cancers in males; incidence of gastric cancer is also the highest among cancers in East China (regions of Shanghai, Hangzhou, etc), while among females incidence of gastric cancer is lower than that of cervical and mammary cancers.

This kind of regional difference of cancerous diseases exists worldwide. For example, India has many cases of cancer of the mouth; Israeli women have eight times as many cases of breast cancer as Japanese women; the incidence of gastric cancer is higher in Japan and Iceland; Jews and Muslims have fewer cases of penial cancer; persons of the white race have more cases of prostatic cancer; the Bantus of Africa have a high incidence of liver cancer. Most recently, it was further discovered that the distribution of lymphatic cancer among African children is definitely higher in regions of a certain altitude with relatively plentiful rainfall. This fact may be related to the large numbers of a certain species of mosquitoes. In regions of high incidence of esophageal cancer in Africa, the nitrosamine content of alcoholic beverages is high and they are also contaminated by zinc. The region of high incidence of liver cancer in Africa has a relatively high temperature and that fact is also related to the presence of a certain toxic species of gums.[5]

Although the precise pathogenesis and mechanism of cancer are not yet completely understood, the large amount of survey and research have proved that as an exogenetic factor, the environment is important in the occurrence and development of certain cancerous diseases and it has been given the necessary attention. It is important that this idea comes from the regularity of geographical distribution of some cancerous diseases.

II. Principle of Geographical Distribution of Several Cancerous Diseases

Cancer is a disorder of about 100 obviously different locations. When there is a change in the environment, there will also be changes in the incidences of various types of cancer. The majority of these 100 disorders are rare; therefore, when the geographical distribution of a few of these is clarified, a general condition of the relationship between cancer and the environment may be explained.

In China, there have been considerable studies on the pathogenesis and the geographical distribution of esophageal, rhinopharnygeal, and primary liver cancers. In the last several years, some surveys have also been carried out on gastric and lung cancers. The following is a preliminary investigation of the principle of geographical distribution and environmental pathogenesis of cancers of the digestive tract involving the esophagus, the liver, and the stomach.

1. Esophageal Cancer

The region of high and medium incidence of esophageal cancer in China is mainly the area bordering the three provinces of Henan, Hebei, and Shanxi, i.e. the arc of both slopes of the central and southern sections of the Taixingshan Mountains. Farther away from this arc, the incidence gradually diminishes, to form a distribution of several irregular concentric circles. In relatively obvious regularity, the difference between the highest and the lowest incidence is about 100 fold. In the areas of high incidence, not only is it easy for groups of people to have esophageal cancer, but the animals (chickens and sheep, etc) also easily suffer from esophageal cancer. More importantly, these are high-incidence areas now as well as historically. This matter, therefore, has a historical hereditary characteristic, indicating that carcinogenetic factors perhaps exist in this region in a relatively stable and persistent form.

In Asia, regions of high incidence of esophageal cancer are distributed in a zone extending from the Middle East to Afghanistan, Soviet Central Asia and a portion of Siberia, Mongolia, and the northern part of China. According to international statistical data, the Turkmen region of the USSR has the highest incidence of esophageal cancer, 110.5 cases per 100,000 persons every year. Next comes Transkei Province of South Africa. Incidence is also relatively high in Equatorial Africa, the western part of Kenya, Iran, the northern part of Chile, France, Finland, India, and Sri Lanka. The large number of surveys of recent years on esophageal cancer, the geographical environment, and the life habits of the local people have disclosed that the high incidence of esophageal cancer in Chile and Iran is related to the scanty rainfall and the high salt content of the soil. In the region of high incidence of esophageal cancer in Central Africa, the inhabitants all have the habit of drinking a special beverage which contains nitrosamines. According to general estimates, the daily intake of nitrosamines by the local inhabitants exceeds the safety limit, and animal experiments have proved that nitrosamines can indeed induce esophageal cancer.

Furthermore, inhabitants of many regions of high incidence of esophageal cancer have the habits of drinking alcoholic beverages, smoking, unsatisfactory oral cleanliness, eating hot foods, or chewing betel nuts. These habits have a definite stimulating effect on the esophageal membrane and may perhaps be carcinogenetic.

2. Liver Cancer

Compared with other cancers, the regional characteristics of liver cancer are even more obvious. It is distributed mainly in a zone from the Equator to the vicinity of the warm part of the Temperate Zone and is rare in the cold part of the Temperate Zone and the Frigid Zone. Incidence of liver cancer is higher in Asia and Africa, especially along the Pacific Coast of Asia and the region south of the Sahara Desert in Africa. It is relatively rare in Europe, America, and Oceania. (see Figure 2)

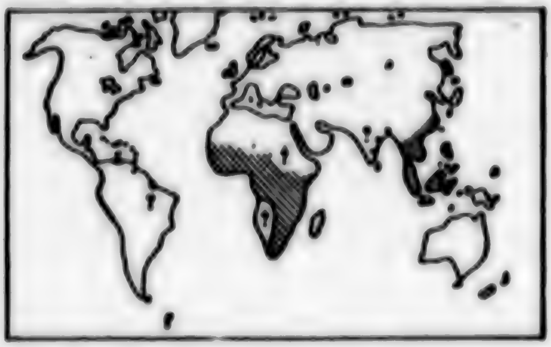

Figure 2. World Distribution of Liver Cancer

A comprehensive study of the data regarding the incidences of liver cancer in the five continents^6 has been carried out, resulting in the conclusion that the incidence of liver cancer is highest in some countries of Africa. For example, in Maputo in Mozambique, the standardized incidence for people 15-44 years of age is 164.6/10,000 of population, the highest known in the world. In Bulawayo, Zimbabwe, it is 79.2/10,000, or 500-10,000 times that of the United States or Europe. The incidence is also relatively high in Tanzania, Uganda, Ethiopia, Togo, Ghana, Greece, Japan, Singapore, and parts of China. A statistical study of all Southeast Asian countries showed that in that region, incidence of liver cancer is higher among immigrants than among the natives. In many countries, immigrants of Chinese ancestry have a higher incidence than the local inhabitants, while the incidence is higher among those Chinese who have resided there for a short time than those who were born and raised locally. All these facts demonstrate the important effects of environmental factors on the genesis of liver cancer, while the effect of genetic factors is minor. The regions of high incidence in Africa are all distributed in areas of high temperature and humidity. When the United States sold its surplus grain to Africa, due to improper storage and the effects of the weather, conditions were created for the growth of molds. Moreover, the local children often picked up the moldy peanuts from the ground and ate them. All these facts have a definite relationship to liver cancer. In recent years, many species of mold on local grains have been isolated. Among these, the toxin of Aspergillus flavus is especially poisonous to the liver. It can induce liver cancer and also cause liver necrosis. In recent years, Japan has also begun to emphasize research on the carcinogenic action of some fungi that are capable of infecting rice.

In China, cases of primary liver cancer exist in the South as well as in the North, but the incidence is higher in some areas of Guangxi and Jiangsu. A review of survey materials on cases of death due to tumors in China's 16 provinces, cities, autonomous regions, and some districts, municipalities, and counties, shows that the average mortality rate due to liver cancer in China is about 10/10,000 of the population. The general liver cancer distribution characteristics in China are as follows: It is higher in the South than the North. It is higher in the East than the West. It is higher in the Southeastern coast than inland. The incidence of liver cancer is higher in areas of combined natural geographical conditions of warm temperature, high humidity, frequent rainfall, low terrain, a river delta or coastal island, and especially having a serious problem of water pollution.

3. Gastric Cancer

According to statistics, the region of the highest incidence of gastric cancer in the world is Central Asia in the USSR, where it is as high as 140-160/10,000 of population each year. It is also high in some areas of Siberia. According to statistical data on death due to stomach cancer in more than 40 countries, it is 74.4/10,000 for men and 42.3/10,000 for women in the USSR, 68.57/10,000 for men and 35.31/10,000 for women in Japan; 58.43/10,000 for men and 29.02/10,000 for women in Chile. These are relatively the highest. The next highest regions are Finland, Poland, and Austria. Incidence of stomach cancer is also relatively high in the scandinavian countries. The lowest incidence of stomach cancer is New Zealand (1.31/10,000 for men and 0.70/10,000 for women). It is relatively rare in Africa, North America, India, and Indonesia.

The incidence of gastric cancer is also relatively high in China. In the Northeast, Central China, and the Northwest, it is the most common malignancy among men. In North China the incidence of gastric cancer is second only to esophageal cancer, in Guangdong it is second only to rhinopharyngeal cancer, and in the Nanning District of Guangxi it is second only to liver cancer. The incidence of stomach cancer in East China (Shanghai, Hangzhou, etc) is also the highest among men; among women it is lower than cervical and breast cancer, however.

Within the past half century, the mortality rate of stomach cancer in the United States has been reduced to almost one-eighth what it was previously. According to research studies, it is perhaps related to the fact that the U.S. Government has been strict about food safety and has been careful about inspection and control of food contamination.

III. Investigations Concerning Carcinogenic and Cancer-Inhibiting Factors in the Environment

Although we have not yet found the concrete pathogenesis of various cancers, if cancer can be induced by environmental factors then theoretically it can be completely prevented.

1. The problem of carcinogenesis of trace elements.

Studies have been carried out in different geographical regions to prove that the content level of elements in the environment is related to the incidences of cancer of the digestive tract (esophageal cancer, gastric cancer, and colon cancer), liver cancer, rhinopharyngeal cancer, laryngeal cancer, cancer of the urinary tract, and leukemia or their mortality rates. It was also discovered that the content of these elements is often determined by the geological condition or the parent material of the soil of the environment. As the distribution of elements in the environment is not even, if, just as some endemic diseases (such as the fact that thyrophyma is known to be caused by iodine deficiency) have been studied, we can find out that cancer at a certain location in a certain geographical region is caused by either a deficiency or an excess of a given element or elements, we can prescribe the proper drug for the disease and put the emphasis on prevention.

In a paper, "Relationship Between the Content of Carcinogenic Trace Metal Elements in City Water of Some Areas of the United States and the Mortality Rate of Cancer," the relationship between the contents of 8 trace elements in the city water of 10 different sources in the United States and the mortality rate of various cancerous diseases of some inhabitants is determined in order to clarify the fact that arsenic is related to the mortality rate of laryngeal cancer, ophthalmic cancer, and leukemia; the beryllium content of water is related to the mortality rate of mouth cancer, laryngeal cancer, and rectal cancer; the cadmium content of water is extremely closely related to the mortality rate of various cancers (especially rectal cancer, esophageal cancer, mouth cancer, and all cancers of the lymph); while the iron, cobalt, and chromium content of water is not related to the cancer mortality rate.

Since 1967, researchers in Finland have begun to notice the relationship between the region of high incidence of stomach cancer and the manganese deficiency of the cropland. This is due to the fact that the deficiency of manganese and selenium (with accompanying deficiency of copper, magnesium, calcium, and phosphorus) causes an imbalance in respiration and metabolism of animal and plant cells. Attention has also been brought to the fact that the regions of high incidence of esophageal cancer are deficient in molybdenum, those of liver cancer have a deficiency of copper and an excess of zinc.

2. The three strong carcinogenic substances in the environment--nitrosamine, Aspergillus flavus, and benzopyrene--are considered the three strong carcinogens of the environment, but certain conditions are often required for them to cause cancer.

The density of nitrosamine in nature is often relatively low, but its antecedents, nitrites and secondary amines exist in great quantities in the human environment. Regions of soils with high nitrogen content, excessive nitrates and nitrites (such as saline and alkaline lands), or of excessive applications of nitrate fertilizer in soils deficient in molybdenum or other trace elements will cause the plants and vegetables (especially spinach, celery, and lettuce) to contain too many nitrates, while the content of secondary amines is high in various species of fish and marine products and especially in fish eggs. When these foods are digested, the nitrates may be reduced by microbes into nitrites which, after reacting with secondary amines, form nitrosamines and become carcinogenic.

Temperature, moisture, and humidity are the necessary conditions for producing Aspergillus flavus. When the temperature is about 30 degrees Celcius, the relative humidity is above 80 percent, the moisture content of grains is above 40 percent, or the moisture content of peanuts is above 9 percent, the condition most suitable for the propagation and growth of Aspergillus flavus is met. When the temperature is at 28-32 degrees Celcius, the quantity of toxin produced by the Aspergillus flavus is the highest. For this reason, the work of preventing mold and removing toxin may be said to be necessary to avoid carcinogenesis of Aspergillus flavus toxin.

Benzopyrene has been used as a single index of the effect of all atmospheric pollutants of 6.2mg/1,000 cubic meters in the density of benzopyrene will double the mortality rate of lung cancer. Benzopyrene exists in relatively great quantities in atmospheric pollutants and cigarette smoke. It has been proved that the probability of lung cancer is 10-50 times higher among smokers than nonsmokers.

3. Certain cancer-inhibiting factors in the environment.

There has been growing attention to the relationship between the trace element molybdenum and human health. According to reports, a deficiency of molybdenum is closely related to the myocardial disease Keshan disease, the pathogenesis of which is yet unknown. Molybdenum may also have a cut-off action in the production and accumulation of some carcinogens such as nitrosamines in the environment. If the soil is deficient in molybdenum, the metabolism of crops may be affected. Due to metabolic anomalies, the accumulation of nitrosamines in grains is higher, and metabolic anomalies may also cause such crops as corn to be easily infected by molds (such as Aspergillus flavus) which are capable of producing carcinogenic toxins and there will be a high incidence of cancer among the local inhabitants. Molybdenum is also a trace element capable of increasing the yield of many crops such as beans on a large scale. Application of molybdenum fertilizer in soils of molybdenum deficiency can therefore increase the yield of crops as well as prevent certain cancers.

Some reports also indicate that the natural environment (soil, water, and plants) of some regions in the United States, Canada, and New Zealand has plentiful amounts of selenium and the incidence of cancer of the gastrointestinal tract is low among inhabitants of these regions, while the density of serum selenium in victims of gastrointestinal cancer (including those of metastatic cancer of the gastrointestinal tract) is lower than normal. Among reports of animal experiments, it also has been stated that ever since water containing selenium has been fed to sheep in New Zealand, incidence of gastrointestinal cancer among herds of sheep has been reduced to almost zero. Moreover, there have also been reports concerning the cancer-inhibiting action of Vitamin C. It is very possible that Vitamin A can prevent people from suffering some major cancerous diseases. Some people also believe that eating and drinking foods and beverages of a high fiber content may have an effect of preventing colon cancer, while a high content of fat in foods is closely related to the increase of incidence of colon cancer in various countries. Eating less meat and fat and more fiber-containing carbohydrates such as grains, vegetables, fruits, and beans may perhaps have the effect of preventing colon cancer.

The occurrence of cancer is closely related to the environment, eating, and drinking; therefore, effective control of the carcinogenic factors of the environment is very important. The environment is divided into the primary environment and the secondary environment. The condition of occurrence of cancer is often related to such geographical factors as water, soil, geology, terrain, and weather of the primary environment. While the quantitative and qualitative difference of trace elements in the geological factor (the soil parent material) and the difference in the climatic condition may be the major cause of the difference in regional distribution of cancer, the carcinogenesis of the secondary environment is often induced by environmental pollution. As many sciences are combined for cancer research, with mankind's active utilization of nature and improvement of nature to prevent environmental pollution, cancer, the "incurable disease," currently regarded as a threat to the health of humans, will definitely be conquered.

REFERENCES

1. Cairns, J., SCIENTIFIC AMERICAN, 233, 5 (1975) 64

2. Tinker J., NEW SCIENTIST AND SCIENCE JOURNAL, 50, 771 (1971) 729

3. Hamilton E.I., THE SCIENCE OF THE TOTAL ENVIRONMENT, 1, 4 (1973) 341

4. U.S. Department of Health, Education and Welfare Public Health Service, "Atlas of Cancer Mortality for U.S. Counties," 1950-1969

5. Institute of Tumor Prevention and Control, Chinese Academy of Medical Sciences; Ritan Hospital: "The Struggle Against Tumors," Kexue Chubanshe, 1973

6. Doll R. et al, "Cancer Incidence in Five Continents" (1970)

6248
CSO: 5000

BEIJING EFFORT TO CONTROL AIR, WATER POLLUTION

OW271617 Beijing XINHUA in English 1549 GMT 27 Mar 81

[Text] Beijing, 26 Mar (XINHUA)--Water and air pollution has been reduced in this Chinese capital city of 8 million people, according to Gao Yusheng, deputy director of the Beijing Municipal Environmental Bureau. And the city plans to control water, air and noise pollution, he said.

Beijing has partially brought pollution under control in underground water supplies, three large reservoirs and two of its seven main rivers after nearly a decade of efforts to protect the environment, the deputy director said. More than 6,800 of the 11,000 boilers, industrial furnaces and kilns in the city now have installed devices to reduce soot and smoke, he said. In addition, 760,000 of the 1 million households in the city proper have replaced coal with gasoil or coal gas as cooking fuel, reducing the annual emission of soot and smoke by 140,000 tons, he said.

Beijing is actively participating in the nationwide drive to plant more trees and grass, which will help control the springtime dust storms caused by high northern winds that blow across the deserts of Inner Mongolia. In northern Chinese cities such as Beijing, the dust storms are often so bad that the sun is almost blocked from view and the faces of women and children are wrapped in colorful transparent scarves for eye, nose and mouth protection.

The deputy director said the city will place pollution control emphasis on the city proper, an area of 62 square kilometers, during 1981. Under the plan, the city hopes to control one-third of the 661 present polluters, including loud noise makers. Gao Yusheng said low-voice loud-speakers will be popularized to replace air horns on automobiles, buses and other vehicles. Since drivers of vehicles have the right-of-way over bicyclists and pedestrians in Chinese cities, constant horn-blowing can be heard throughout the day in Beijing.

Gao Yusheng also said the city plans to establish several more waste water treatment plants. The present two plants can only dispose of 8 percent of the 1.8 million tons of sewage and industrial waste water. The remainder of the sewage and waste is still discharged into streams and ditches in the city, he said. After completion of these treatment centers, he said, part of the processed waste water from the city will be used to irrigate farmland.

Beijing started to control pollution in 1972. Now an environmental protection network has been established with an environmental protection bureau research institute and a monitoring center to check pollution levels. The 11 districts and counties of the municipality all have established environmental protection and monitoring stations. With the participation of leaders of districts, counties and industrial enterprises, seven water-source protection groups have been organized that check and supervise polluters and help them control pollution, he said.

At the same time, the Beijing Municipal People's Government issued a series of rules and regulations for environmental protection. These documents stipulate that all projects that might cause pollution must install pollution control devices during construction. Such plants may not be built in the city proper or the water source areas of the city. Many existing polluters have been notified that they must control pollution within a stated period of time. Those units responsible for serious pollution accidents must compensate the collective or individual victims for the losses or be fined under the regulations.

Gao Yusheng said that so far 324 of 401 major polluters along the seven major rivers around the municipality have adopted effective measures to bring pollution under control. The total annual discharge of phenol in the municipality has decreased 88 percent; cyanogen, 80 percent; mercury, 97 percent; chromium, 45 percent; arsenic, 87 percent, and cadmium, 85 percent. These six substances are the main pollutants in the water of Beijing, he said.

The capital iron and steel complex, one of the major polluters along the Lianhua River in the western suburb of the city, used to discharge 500 tons of phenol into the river each year. By retrieving and biochemical treatment of the water, the complex's annual discharge of phenol is now less than 10 tons. The plant also recovers furnace scrubber water for heat circulation use, thus saving 15 million tons of water every year. Both steps greatly reduced the discharge of pollutants, he said.

The Beijing chemical experimental works, another big polluter in the city, used to remove hydrosulfide from semi-water gas by the glammarco-vetrocoke process, a method that discharged 35 tons of arsenide into the water each year. The works now desulfurizes semi-water gas by the tannin extract process, a new method developed by the works, solving the problem of arsenide pollution, the environmental bureau official said.

The Shijingshan District, where the capital iron and steel complex is located, is at the upper reaches of Beijing's underground water supply. The layer of topsoil in this area is thin and sandy. In order to prevent the pollution of the underground water by infiltration of industrial waste water, the municipal People's Government allocated 2 million yuan (RMB) to build a 17-kilometer-long canal to empty waste water from the Shijingshan District for farmland irrigation in the Fengtai District where the topsoil is thick and solid. The waste water meets state standards for irrigation, Gao Yusheng said. The canal not only solved the water pollution problem, but also resulted in a 30 percent grain output increase in the Fengtai District, he said.

CSO: 5000

PEOPLE'S REPUBLIC OF CHINA

POLLUTION CONTROL PLAN FOR KUNMING MUNICIPALITY OUTLINED

Kunming YUNNAN RIBAO in Chinese 4 Feb 81 p 1

[Article: "Controlling Pollution, Benefiting the People--Kunming Municipal CCP Committee and Municipal Revolutionary CCP Committee Discuss Draft Plan for Controlling the 'Three Wastes' of City Pollution"]

[Text] The Kunming Municipal CCP Committee and the Municipal Revolutionary CCP Committee recently summoned the Municipal Environmental Protection Bureau, the Municipal Planning Bureau, the Municipal Economic CCP Committee and other concerned departments to discuss and study a plan for controlling the "three wastes" [waste gas, waste water, and industrial residue] of city pollution. They resolved to integrate the plan with the national economic readjustment and adopted measures to control, transfer, and change production and to restrict new sources of pollution. These measures are aimed at the following: within 5 years, to bring under control, by stages and in groups, the industrial plants critically polluting the urban area; within 10 years, to change fundamentally the critical conditions engendering irritants to the people, to restore to its previous state the city's beautiful scenery and agreeable climate, and to build a beautiful, neat and civilized city providing suitable, tranquil living conditions for the people of Kunming municipality and for the benefit of future generations.

As the rapid development of industry kept pace with the tremendous population increase in the Kunming urban area, the pollution from the "three wastes" became progressively more critical. In addition to the coal burned in the network of eating establishments, in civilian boilers and used by the inhabitants, at present there are 337 industrial plants and 207 hospitals and health stations of all sizes in the urban area which spew large volumes of contaminated smoke into the air and large volumes of contaminated water into the rivers and underground waters, polluting them to the point that the atmosphere is filled with soot and harmful gases and the water contains harmful substances which on the average greatly exceed national health standards; and the rumblings and noises of the industrial traffic constitute a serious irritant to the people. Some measures have been adopted in the past few years, but they have not yet produced significant worthwhile changes. Since last year the Municipal CCP Committee and the Municipal Revolutionary CCP Committee critically examined this situation, twice conducted specialized studies, and instructed the concerned and responsible departments to conduct investigative studies in order to draft an initial plan for controlling city pollution. Recently these party committees again summoned the various concerned departments to discuss this plan. The Municipal CCP Committee and the Municipal Revolutionary CCP Committee held a discussion and decided that all of the assorted enterprises and business units are to adopt active measures, under the supervision and urging of the Municipal Environmental Protective Bureau, to control the "three wastes"; and that the Municipal Economic CCP Committee, taking into account differing circumstances, should apply controls on the 65 enterprises critically polluting the municipal area. Onsite organized controls will be gradually implemented so that by 1990 there will be complete regulation of the plants which have technically feasible control sites and of the 40 nontransferable textile, plastics, everyday chemicals, and food industry plants. Those plants at which it is not technically feasible to have control sites, the 23 plants producing goods in short supply vital to the municipal market, will be organized and transferred to the suburbs. They will be completely transferred out of the urban area by 1985 and the vacated industrial plants, housing, etc, will be used for running primary schools, nurseries, and kindergartens to repay a debt to the people's livelihood. Other industrial plant enterprises which have goods that are unmarketable and raw materials that are unsafe will be integrated into the industrial readjustment, and decisions will be made to adopt methods for halting or changing production, or for merging them within suburban industrial plants. In addition, new pollution sources will be strictly controlled. From now on, no additional new industrial plants will be built within the city. As a general rule there will be no more new extensions to production capacities, and specific cases which do require extensions will adhere to the principles of the "three togethers" [eat, live and work together] and will not be permitted to resume operations without having the means to control the "three wastes." In addition, the Municipal CCP Committee and the Municipal Revolutionary CCP Committee asked all responsible departments to work out a control plan as soon as possible for the urban area's waterways, and they also requested permission from the provincial government to designate the Songhua Dam reservoir as a special protected zone.

Implementing this control plan calls for a great deal of propaganda education and organizational work. It requires bringing the inititive of all aspects into play, going through many kinds of channels, and raising huge funds. It requires all the units in Kunming to seek unity of recognition and coordinated cooperation, and gradually to implement the plan of action step by step. Because of this, the Municipal CCP Committee and the Municipal Revolutionary CCP Committee instructed the concerned departments at the various affiliated conferences convened recently to seek unity of recognition, unity of action, and to strive jointly with all their hearts and strength to control the city's pollution for the benefit of the people.

9703
CSO: 5000

POLLUTION IN ZHOUSHAN FISHING GROUNDS DISCUSSED

Shanghai WEN HUI BAO in Chinese 28 Jan 81 p 2

[Article: "Zhoushan Fishing Grounds Should Be Key State-Protected Zone--Some Comrades From Zhejiang and Jiangsu Suggest Supervision of Fishing Grounds To Swiftly Remedy Irrational Fishing Practices"]

[Text] Staff news report--Deputy Director Tong Wanshu [4547 1354 2579] of the Zhejiang Provincial Environmental Protection Office, Deputy Chief Wang Yong [3769 0516] of the Jiangsu Provincial Environmental Protection Bureau and others, while attending related conferences in Shanghai, told reporters that some of the maritime waters in the Zhoushan fishing grounds have been polluted as a result of irrational fishing practices, causing a significant drop in the fishing industry's output. They proposed designating the maritime waters in the Zhoushan fishing grounds a key state-protected zone.

The Zhoushan fishing grounds, the largest in the country, have had a serious decline in output for the past few years, and some species of fish are on the verge of extinction. In 1979 jellyfish output was reduced by nearly 1/2 million dan, yellow croaker output by more than 2 and 1/2 million dan, and hairtail output by over more than 2 million dan. Some of the aquatic products off Muyidao, such as razor clams, mud snails, mud clams, mussels lavers, and qundaicai [5942 1601 5475, ulopteryx pinnatifida], have either disappeared or declined sharply. The mud snails used to be big and robust, whereas now they are small and few in number. Why has there been such a serious decline in output? It is mainly irrational fishing practices which have led to the depletion of natural resources. In the past, young yellow croakers and hairtails were not sought as a rule; now it doesn't matter if they are young just as long as they don't slip through the net. As the fishing season approaches hundreds of thousands of fishermen flock to the fishing harbors, and in addition to fishermen from Jiangsu, Shanghai, Zhejiang, Fujian and other provinces and cities, there are fishermen from our northern provinces and cities, and from Japan and South Korea as well. Another reason is that the maritime waters near the coast are polluted. A study monitoring pollution in the East China Sea indicates that Changjiangkou, Hangzhouwan and the eastern portion of the maritime waters of Fujian Province have been polluted in varying degrees by petroleum, organic chlorine pesticides, organic matter, and other harmful substances. The breeding grounds for adult yellow croakers which historically were the vast waters off Hangzhouwan's Taishan Mountain have now moved further out. Tanhudao has had a steadily declining output of jellyfish since 1976.

In view of these facts, Tong Wanshu, Wang Yong and others have proposed the following: designation of the maritime waters of the Zhoushan fishing grounds as a key state-protected zone; establishment of administrative regulations for the protected zone; regulation of the amount of pollutants, especially petroleum, allowed to be discharged by industrial plants, shipping vessels, and naval vessels; and imposition of penalties for exceeding set standards. At the same time, reasonable fishing quotas should be established, depletion fishing should be prohibited, nets should not be permitted during the breeding season, and the young fish should be protected. Corresponding special organs should also be established to strengthen administration of the fishing grounds and effectively carry out the various operations for protecting the Zhoushan maritime waters. They hope the state will devote a lot of attention to protection of Zhoushan's natural resources, place them under regulations, complete monitoring and preventive treatment tasks, and proceed urgently to control the sources of pollution.

9703
CSO: 5000

DROUGHT, FLOODING INCREASING IN YUNNAN

Guangzhou HUANJING [ENVIRONMENT] in Chinese No 1, 1981 pp 20-21

[Article by Wang Huanxiao [3769 3562 2699], instructor, and Zhou Hong [0719 7703], graduate student, in the Biology Department of Yunnan University: "Why Are Drought and Flooding on the Increase in Yunnan?"]

[Text] In the past 30 years the frequency of drought and flooding in Yunnan has increased markedly, causing concern to many people. Statistics show that from 1470 to 1950 severe drought occurred in Yunnan every 9.6 years on the average; however, from 1950 to 1978, extensive spring drought and spring-summer drought occurred every 3.2 years on the average; that is, the frequency of drought has tripled. In the same period, 1950 to 1978, flooding also increased to an average frequency of every 3.2 years.

Why are drought and flooding on the increase in Yunnan? The most important cause is the damage to the forest resources. The area of forest coverage in the province has decreased from 27 percent to 24.2 percent in the period 1963 to 1975 alone; the amount of forest reserve has also decreased from 1.13 billion cubic meters to 0.988 billion cubic meters in the same period. In addition to arbitrary logging without planting and the opening up of forest areas for cultivation, forest fires are also a major cause of depletion. In 1979 there was a total of some 10,000 forest fires, causing about 10.05 million mu of forest to be destroyed and almost 100,000 young trees to be burned down--that is, equivalent to the total afforestation in the province since the revolution.

Damage to the forest resources invariably leads to more frequent drought and flooding. This can be understood from the effect of forests on the major and minor circulations of water. The water circulation on earth can be divided into two parts. The major circulation of water is an exchange of water between the ocean and the land. Part of the water evaporating from the ocean is transported over the land through atmospheric circulation and becomes precipitation. Part of the precipitation soaks into the ground, part evaporates in the sky and still another part flows back into the ocean by way of rivers. This constitutes the major circulation of water. In the minor circulation, water evaporating from the ocean and the land condenses into rain and snow and thus returns to the ocean and the land. The driving force of the water circulation is solar radiant energy. Forests have important effects on the major and minor circulation of water in the local area. (see Figure 1)

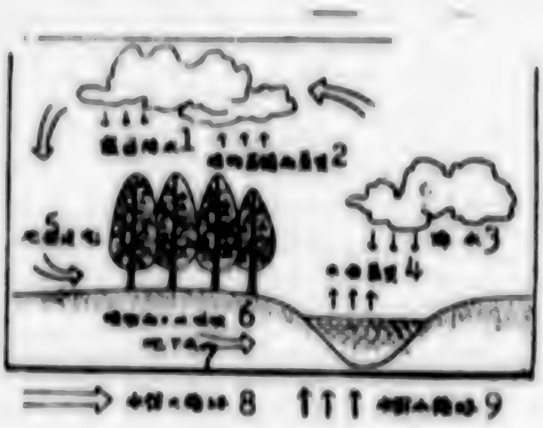

Figure 1. The major and minor circulations of water.

Key 1. Intercepted precipitation
2. Vegetation exhalation and evaporation
3. Precipitation
4. Surface evaporation
5. Surface return flow
6. Absorption by vegetation and soil
7. Underground water
8. Major circulation
9. Minor circulation

In the presence of a forest, the rainwater first encounters the dense treetop layer, and 15 to 40 percent of the water is intercepted. About half of the rainwater that reaches the ground through the openings in the treetops is retained by fallen branches and leaves. Thus, washing away of the topsoil by the surface water is greatly reduced, and as a result regulation of the forest not only provides a uniform supply of ample water but also prevents the sudden rise and fall of the water level in the rivers.

Through the exhalation of the various types of vegetation in a forest colony, a great amount of water vapor is evaporated into the atmosphere. In the summer a full grown large tree can absorb 25 to 70 jin of water from the ground every day; of this, less than 1 percent is retained by the tree and more than 99 percent is evaporated through the numerous pores of the leaves into the atmosphere. Studies have shown that 1 mu of broad-leaf forest can evaporate 160 tons of water in a summer, which is more than the amount evaporated by an equal area of ocean surface at the same latitude. This evaporation greatly increases the amount of moisture over a forest, properly decreases the temperature in the vicinity, and facilitates the formation of precipitation. So, in the area of a large forest, in addition to the precipitation carried by the atmospheric circulation, there is also the rainfall due to the evaporation of water from the vegetation in the forest. The precipitation in such areas is relatively large and uniform, temperature variations are not severe, and mild, moist weather conditions are constantly maintained. Moreover, the immense root system of the forest colony also strengthens the lumping structures of the soil, improves the drainage and aeration, and helps prevent flooding.

Many vivid proverbs have been created by longtime inhabitants of forest lands, such as: "An inch of tree holds a peck of water and keeps the ground warm within yards," "With a forest, the spring will not run dry, the mountain will be showered by rain and there is no worry about drought," and "Near a forest, the land will not be flooded, the seedlings will be healthy and the crops will grow well." These proverbs really bring out the scientific principles of the forest's functions in maintaining moisture, preventing erosion and soil water loss, preventing drought and flooding, and regulating the weather.

The first thing that happens after a forest is destroyed is a serious loss of soil by runoff. For example, the flow of sand in Jinsha Jiang has increased from a level of 130 million tons in 1958 to 290 million tons in 1974--that is, more than double the 1958 amount. After a forest is destroyed, the water reserving and regulating functions will be lost and the water flow in rivers will also be greatly reduced. This has even happened to the scenic area of Heilongtan (Black Dragon Lake) in Lijiang County. This area used to be densely forested and was famous for its scenic mountain and water. After the trees on surrounding mountains were chopped down in 1958, there remained only bald mountains, shallow water, and turbulent yellow water in rainstorms. Recently, through an afforestation effort on surrounding mountains, the old scenic view has gradually been restored. Depleted forests can also lead to a dramatic drop in humidity in the atmosphere and dry weather. In Xishuangbanna, which is famous for its tropical rain forest, there used to be many foggy days with prolonged thick fogs in the drought season that were highly beneficial in reducing spring drought; now the number of foggy days has decreased due to damage to the forests. In Damenglong and Jinghong, the number of foggy days in 1977 was less than that in 1958 by as much as 28.6 percent.

Forests are green treasures. Damage to forests may not only cause worrisome increases in drought and flooding, unless proper attention is given, but it can also lead to even more serious consequences. The lessons of history must be heeded. Forest protection and afforestation efforts are major endeavors of vital importance to the people of the entire nation.

9698
CSO: 5000

GOVERNMENT DRAFTS LAW ON NOISE POLLUTION

Taiepi CHINA POST in English 23 Mar 81 p 12

[Text]

Noise makers will soon find making noise very costly. The draft of a law on the punishment and fining of noise makers has been submitted to the [illegible] for further review.

According to the draft, those making noise exceeding a certain level will be punished. If noise is made by a driver who unreasonably honks his horn, he will be fined a sum ranging from NT$900 to NT$6,000; if noise is made by a factory, the owner will be fined a sum ranging from NT$12,000 to NT$30,000; the owner of a noisy recreational organization or center will be fined NT$6,000 to NT$15,000; construction site, NT$12,0. to NT$60,000; local opera staged in a public area, [illegible]. Other violators will be fined from NT$1,500 to NT$15,000.

If noise is made intermittently, the noise maker will be fined each time he creates a disturbance; and if the noise is made continuously, the fine will be imposed every day. If there is no improvement after advice and warnings have been given, violators will be banned from engaging in further business.

CSO: 5000

BRIEFS

NEW ENVIRONMENTAL BODY--The Ministry of Housing and Lands will have an Environment Division from April 1 this year and more measures are being taken to protect and enhance the environment. This was stated by Minister of Tourism, Mr Bernard St John at Enterprise, Christ Church last Wednesday where he opened a new life-guard station. The Minister said that the Division will ultimately integrate Town and Country Planning Development, the Environmental Engineering Division of the Ministry of Health, the Caves Authority and the Parks and Beaches Commission. A national council for the environment is also being proposed. The Environment Division is being designed to protect the coastline from erosion by natural and man-made phenomena; clear beaches of debris and oil spills and erect new public facilities and improve existing ones. As well as these, it is also to be responsible for projects aimed at urban and rural renewal as a means of contributing to the overall objective of creating a wholesome environment, Mr St. John said. He noted that the Oistins Redevelopment project in particular will have a social and economic impact in the creation of recreational facilities and the new fishing village. Mr St John is parliamentary representative for Christ Church South Central, where the new life-guard station is located. [Text] [Bridgetown ADVOCATE-NEWS in English 14 Mar 81 p 2]

CSO: 5000

BRIEFS

POWER COMPANY POLLUTION--The Pembroke West Central Branch of the United Bermuda Party is asking Minister of Planning, Housing and the Environment, Dr. the Hon. John Stubbs, to introduce legislation to control air pollution. The request comes because of concern of residents in Pembroke West about the "environmental pollution and noxious discharges" emitted by the Bermuda Electric Light Company and Salisbury Construction. Miss Diane Ferguson, chairman of the Pembroke West Central Branch, said in a press release: "The problems affect the homes of constituents in the vicinity through dust and dirt from some industrial businesses permeating their homes and business premises." She added that this results and cars, varnished floors and foliage, and soiling of laundry. [as published] She expressed the hope that Dr. Stubbs would act quickly to alleviate the problem. She said that she accepts that legislation does exist which regulates emission from cruise ships, but felt that special legislation is required to relieve the problem in Pembroke West Central. Pembroke West Central United Bermuda Party Members of Parliament, Dr. the Hon. Clarence James and Mrs. Ann Cartwright De Couto are backing the branch. [Text] [Hamilton THE ROYAL GAZETTE in English 16 Mar 81 p 1]

CSO: 5000

BRIEFS

OIL CLEANUP CRITICISM--Environmental activists have expressed concern over how the February 21 oil spill at Alligator Pond has been handled. The GLEANER has been informed that the clean-up operationgs have ignored a formal procedure, worked out to be applied in cases of such oil spills, and that the action taken was independent of the Jamaican authorities. [as published] One of the main concerns of the environmentalists has been the use of a dispersant by Shell in such close proximity to what has been described as "an active fishery." They said that although the dispersant itself might not be toxic it has the action of dispersing toxicity from the oil through the water column. The environmentalists say that this means that instead of remaining on top of the water, the oil is spread through all the layers of water. Thus, its effect on marine life is increased. They maintain that the "oil contingency plan," which should be applied internationally, calls for the use of a boon to surround the escaped oil so as to contain it. The next step is to pump the oil from the surface of the enclosure. However, they say, this was not followed in the Alligator Pond operation. Disappointment has also been expressed about the relative inactivity of the Government agencies such as the Natural Resources Conservation Department in the Alligator Pond affair. [Text] [Kingston THE DAILY GLEANER in English 9 Mar 81 p 1]

CSO: 5000

BRIEFS

CLOUD SEEDING ENDS--A total of 1,281 clouds were seeded by the Department of Meteorological Services this season. In Matabeleland last week 14 clouds were seeded in the north and 22 in the south. "There is no further requirements for cloud seeding this season and no further sorties will be flown," the department's cloud seeding report said yesterday. [Text] [Salisbury THE HERALD in English 2 Apr 81 p 3]

CSO: 5000

END

END OF FICHE

DATE FILMED

4/16/81